

CLAIMS

What is claimed is:

1. A method of manufacturing a pad for polishing a substrate, the method comprising the

5 steps of:

- a) providing a polymer sheet having a substrate contacting area;
- b) heating the area a sufficient amount; and
- c) applying mechanical pressure greater than 1500 psi (10.3 megapascals) to the area during at least a portion of the heating step.

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2. The method of claim 1 further comprising the steps of:

- d) cooling the polymer sheet; and
- e) providing a sufficient amount of mechanical pressure to the sheet during at least part of the cooling step.

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3. The method of claim 1 wherein the polymer sheet comprises a thermoplastic polymer.

4. The method of claim 1 wherein the polymer sheet comprises a non-woven felt impregnated with a thermoplastic polymer.

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5. The method of claim 3 wherein the step of heating the polymer sheet a sufficient amount comprises heating to temperatures greater than about 300 degrees F (149 degrees C).

25 6. The method of claim 4 wherein the step of heating the polymer sheet a sufficient amount comprises heating to temperatures greater than about 300 degrees F (149 degrees C).

7. The method of claim 3 wherein the step of heating the polymer sheet a sufficient amount comprises heating to temperatures in the range of about 300 degrees F (149 degrees C) to about 450 degrees F (232 degrees C).

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8. The method of claim 4 wherein the step of heating the polymer sheet a sufficient amount comprises heating to temperatures in the range of about 300 degrees F (149 degrees C) to about 450 degrees F (232 degrees C).
- 5 9. The method of claim 4 wherein the thermoplastic polymer comprises polyurethane and the step of heating the polymer sheet a sufficient amount comprises heating to a temperature of about 400 degrees F (204 degrees C).
- 10 10. The method of claim 1 wherein step c comprises compressing the polymer sheet to a predetermined thickness.
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11. A method of manufacturing a pad for polishing a substrate, the method comprising the steps of:
- 15 providing a polymer sheet comprising a non-woven felt impregnated with a thermoplastic polymer, the sheet having a density less than about 0.7 grams per cubic centimeter, the sheet having a substrate contacting area;
- 20 heating the area a sufficient amount and contemporaneously applying a sufficient amount of mechanical pressure to the area so that the density of the sheet increases to greater than about 0.7 grams per cubic centimeter.
- 25 12. The method of claim 11 wherein the mechanical pressure compresses the polymer sheet to a predetermined thickness.
13. The method of claim 11 wherein the mechanical pressure compresses the polymer sheet to a density greater than about 0.9 grams per cubic centimeter.
- 30 14. The method of claim 11 wherein the mechanical pressure compresses the polymer sheet to a density of about 1 gram per cubic centimeter.

15. A polymer composite comprising a non-woven felt of polymer fibers impregnated with a resin, the composite having a density greater than about 0.70 grams per cubic centimeter,
5 the composite having a Shore D hardness of at least 50.

16. The composite of claim 15 wherein the resin comprises a polyurethane and the felt comprises polyester.

10 17. The composite of claim 15 wherein the density is about 1 gram per cubic centimeter.

18. The composite of claim 16 wherein the Shore D hardness is greater than about 60.

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19. A method of making a composite polymeric material, the method comprising the steps of:

providing a non-woven felt impregnated with a polymer resin;

applying heat to the felt and the resin at a temperature in the range of about 358

degrees Fahrenheit (181 degrees C) to about 450 degrees Fahrenheit (232 degrees C) and contemporaneously applying a mechanical pressure greater than about 2500 psi (17.2 megapascals);

cooling the felt and the resin; and

providing a sufficient amount of mechanical pressure to the felt and the resin during

25 at least part of the cooling step so as to maintain a planar surface for the felt and the resin.

20. The method of claim 19 wherein the pressure is about 2900 psi (20 megapascals).